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Smyth

AN ACCOUNT OF THE EXPERIMENT

MADE AT THE DESIRE OF THE

LORDS COMMISSIONERS of the ADMIRALTY,

ON BOARD THE

UNION HOSPITAL SHIP,

TO DETERMINE THE EFFECT OF THE

NITROUS ACID IN DESTROYING CONTAGION,

AND THE SAFETY WITH WHICH IT MAY BE EMPLOYED.

IN A LETTER ADDRESSED TO

THE RIGHT HON. EARL SPENCER,

&c. &c. &c.

BY

JAMES CARMICHAEL SMYTH, M. D. F. R. S.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,

AND

PHYSICIAN EXTRAORDINARY TO HIS MAJESTY.

PUBLISHED WITH THE APPROBATION OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

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THE RIGHT HONOURABLE

EARL SPENCER,

&c. &c. &c.

MY LORD,

THE general opinion entertained of your Lordſhip, in the high department, at the head of which you are placed, is the only apology I can offer for having taken the liberty to trouble you on the ſubject of my late publication. The immediate attention paid to this by your Lordſhip, and by the reſt of the Lords Commiſſioners of

the Admiralty, is extremely flattering to me, as an individual, and claims my warmeſt gratitude; but it is of much more importance, my Lord, as holding out to the nation, a well grounded confidence, that no object which may be conducive to the public ſervice, or to the preſervation of thoſe brave men, the pride and protectors of their country, can long eſcape your Lordſhip's notice. I have now the honor to lay before you, and the reſt of the Lords Commiſſioners of the Admiralty, an account of the Experiment made on board the Union, at your Lordſhip's deſire, and likewiſe of thoſe trials that were made at the deſire of the Ruſſian Admiral, and with your Lordſhip's approbation, on board ſome ſhips of his ſquadron. I conſider myſelf, in executing this taſk, as only performing

forming a duty I owe to your Lordſhip, and which I do with the greater pleaſure, as it may poſſibly be the means of making public a diſcovery which ſhould be univerſally known; and as the only way in my power to bring forward the merit of thoſe Gentlemen, to whoſe aſſiſtance I have been particularly indebted for the fortunate iſſue of this experiment, and from whoſe reports I am enabled to preſent your Lordſhip with an account of the manner in which it was conducted, and of the particular effects it produced.

Mr. Menzies, late Surgeon to his Majeſty's ſloop the Diſcovery, was the perſon who, at my requeſt, very obligingly undertook the management of the experiment on board the Union, and it is but doing

him juſtice to ſay that I could not have found a gentleman better qualified, in every reſpect, for executing ſo important a truſt. I ſhall therefore, my Lord, without farther preface, lay before you, and the reſt of their Lordſhips, Mr. Menzies's journal, as affording a better deſcription of the experiment, ſo long as he continued to conduct it, than any I can offer.

REPORT

REPORT

OF THE

EXPERIMENT

FOR

Stopping the Progreſs of Contagion, *as executed on board the Union Hoſpital Ship, at Sheerneſs, by Mr. Arch. Menzies.*

DOCTOR James Carmichael Smyth having been requeſted, by the Lords Commiſſioners of the Admiralty, to ſend a perſon on board the Union Hoſpital Ship, laying at Sheerneſs, to make trial of the effect of a fumigation of the Nitrous Acid,

and of other means recommended by him in a late publication, for deſtroying Contagion, I readily engaged, upon application being made to me by ſome of our common friends, in the execution of an experiment which I foreſaw might eventually be of much benefit to ſociety, and particularly to that ſervice, to which I have the honor to belong.

After having, therefore, received inſtructions, and obtained every neceſſary information on the manner of conducting the fumigation, I left London on the 24th of November, 1795, and arrived at Sheerneſs the ſame evening.

Next morning I waited on Admiral Buckner, the commanding officer of the port, whoſe politeneſs and zeal to promote the object of my journey, were equally conſpicuous, and deſerves my moſt grateful acknowledgment.

I afterwards went on board the Union, where I produced the orders of the Admiralty

rality to Lieutenant Quarme, the command-ing officer, and Mr. Baſſan, ſurgeon of the ſhip, who received me with cordiality, and readily offered every aſſiſtance in their power to carry on the experiment, upon the event of which not only the ſafety of the ſhip's company, but, perhaps, their own, in great meaſure, depended.

On examining the ſtate of the hoſpital, I plainly foreſaw that freſh contagion would be daily pouring into it from the Ruſſian veſſels, under which diſadvantageous circumſtance, it would be difficult to decide on the ſucceſs of our endeavours. The lower and middle gun-decks were divided into large apartments, or wards, by croſs partitions, with a free communication between each;* they were extremely crouded, and the ſick of every deſcription lay in cradles, promiſcuouſly arranged, to the number of nearly two hundred; of which about one

*To give a more exact idea, I refer to the drawing of the ſhip which accompanies this journal.

hundred and fifty were in different ſtages of a malignant fever, extremely contagious, as appeared evident from its rapid progreſs, and fatal effects, amongſt the attendants on the ſick, and the ſhip's company. For, from the beginning of September laſt, when the Ruſſian ſick were firſt admitted into the hoſpital; eight nurſes and two waſher-women had been attacked with this fever, and of theſe three had died. About twenty-four of the ſhip's company had likewiſe been ill of the ſame diſorder, and of theſe a ſurgeon's mate and two marines died. Upon the whole, however, the mortality had not been ſo great as there were reaſons to dread, from the virulence of the contagion, and malignity of the diſeaſe; which can only be aſcribed to the great care and attention of Mr. Baſſan, ſurgeon to the hoſpital, whoſe conduct in ſo critical a ſituation does him the higheſt honor, and reflects luſtre on his profeſſional abilities, in the faithful diſcharge of ſo unpleaſant a duty.

After I returned on ſhore from the Union, I employed the reſt of the day in collecting and ſending on board ſuch utenſils and materials as were required for fumigating the ſhip; theſe conſiſted of a quantity of fine ſand, about two dozen quart earthen pipkins, and as many ſmall common tea cups, together with ſome long ſlips of glaſs to be uſed as ſpatulas; the other materials I had brought with me from town, viz. the concentrated vitriolic acid, and a quantity of pure nitre in powder.

On the forenoon of the twenty-ſixth I went again on board the Union. I firſt ordered all the ports and ſcuttles to be cloſe ſhut up; the ſand, which had been previouſly heated in iron pots, was then ſcooped out into the pipkins by means of an iron ladle, and in this heated ſand, in each pipkin, a ſmall tea cup was immerſed, containing about half an ounce of concentrated vitriolic acid, to which, after it had acquired

quired a proper degree of heat, an equal quantity of pure nitre in powder was gradually added, and the mixture ſtirred with a glaſs ſpatula, until the vapour aroſe from it in conſiderable quantity. The pipkins were then carried through the wards, by the nurſes and convaleſcents, who kept walking about with them in their hands, occaſionally putting them under the cradles of the ſick, and in every corner where any foul air was ſuſpected to lodge. In this manner we continued fumigating, until the whole ſpace between decks was, fore and aft, filled with the vapour, which appeared like a thick haze.

I however proceeded in this firſt trial ſlowly and cautiouſly, following with my eyes the pipkins in every direction, to watch the effect of the vapour on the ſick, and obſerved that at firſt it excited a good deal of coughing, but which gradually ceaſed, in proportion as it became more generally diffuſed through the wards, this

effect

effect appeared indeed to be chiefly occaſioned by the ignorance or inattention of thoſe who carried the pipkins, in putting them ſometimes too near to the faces of the ſick, by which means they ſuddenly inhaled the ſtrong vapour, as it immediately iſſued from the cups.

In compliance with Doctor Smyth's requeſt, the body-clothes and bed-clothes of the ſick were, as much as poſſible, expoſed to the nitrous vapour during the fumigation; and all the dirty linen removed from them was immediately immerſed in a tub of cold water, afterwards carried on deck, rinſed out, and hung up till nearly dry, and then fumigated before it was taken to the waſh-houſe; a precaution extremely neceſſary in every infectious diſorder. Due attention was alſo paid to cleanlineſs and ventilation.

As the people were at firſt very awkward and ſlow, it took us about three hours to fumigate the ſhip; in about an hour after,

after, the vapour having entirely ſubſided, the ports and ſcuttles were thrown open, for the admiſſion of freſh air. I then walked through the wards, and plainly perceived that the air of the hoſpital was greatly ſweetened, even by this firſt fumigation.

Next morning the ſhip was again fumigated, beginning with the lower deck, and the people employed, being now better acquainted with the operation, were more expert, and finiſhed the whole in about an hour's time; in an hour afterwards, the vapour having entirely ſubſided, the freſh air was freely admitted into the hoſpital.

This day the ſand was made hotter, and the fumigation was of courſe much ſtronger, yet the patients ſuffered no other inconvenience from it, than a little coughing, and even that was not near ſo general as the day before.

Twelve

Twelve pipkins were found ſufficient for fumigating the lower deck, ten for the middle gun deck, two for the ſhip's company's bed-room, two for the marines bed-room, and one for the waſhing place; in all twenty-ſeven pipkins. Conſequently, about fourteen ounces of the vitriolic acid, and as much nitre, was expended in the forenoon; but, in the evening, as every place was ſo cloſe, and the freſh air could not be afterwards ſo freely admitted, it was not thought neceſſary to employ ſo many pipkins; ſo that little more than half the quantity of the fumigating materials, uſed in the morning, was generally found ſufficient for the evening's fumigation.

The pleaſing and immediate effect of the fumigation, in deſtroying the offenſive and diſagreeable ſmell ariſing from ſo many ſick crouded together, was now very perceptible, even to the nurſes and attendants. The conſequence of which was, that they now began to place ſome degree of

of confidence in its efficacy, and approached the cradles of the infected with leſs dread of being attacked with the diſorder; ſo that the ſick were better attended, and the duty of the hoſpital was more regularly, and more cheerfully, performed. In ſhort, a pleaſing gleam of hope ſeemed now to caſt its cheering influence, over that general deſpondency which was before evidently pictured in every countenance, from the dread and horror each individual naturally entertained of being, perhaps, the next victim to the malignant powers of a virulent contagion.

On the twenty-eighth, the fumigation was repeated morning and evening, in the ſame manner as on the preceding day, and with the ſame pleaſing effect, deſtroying the offenſive ſmell, and purifying the general air of the hoſpital. But there was, in particular places, a conſtant ſource of bad ſmell, which was not eaſily overcome, and which was occaſioned by the *neceſſaries*.

Theſe

Theſe were badly conſtructed, being placed within the ſhip, to the number of ſeven on the lower deck, and two on the middle deck, with ſmall funnels that pierced the ſides of the ſhip in a ſlanting direction, and generally retained the *ſoil*, unleſs where a perſon conſtantly attended to waſh it away, a very troubleſome and dangerous office, which chiefly fell to the lot of the nurſes, and doubtleſs tended to ſpread the contagion amongſt them.

I mentioned this nuiſance to the commanding officer, who told me that he viewed them in the ſame light, and that ſome alterations were making, which he hoped would remedy the evil. I therefore waited a few days the event of theſe alterations before I ſhould make any public report on the ſubject.

For the following eight days I continued the fumigation on board the Union, regularly morning and evening, as already deſcribed, without obſerving any particular

occurrence different from what is already related, only that during this time, a conſiderable number of patients having been diſcharged from the hoſpital, all the ſpare cradles were ordered on deck, to be ſcrubbed and waſhed with the diluted marine acid, according to the particular directions of Dr. Smyth.

On the ſeventh of December, I reſigned to Mr. Baſſan the further proſecution of the experiment on board the Union hoſpital ſhip; but before I leave her, I muſt ſay, that it has already produced the moſt evident and beneficial effects, as not one of the attendants on the ſick, nor any of the ſhip's company have been attacked with the diſorder ſince I began the fumigation, with the exception of one nurſe, who ſuffered a ſlight relapſe from ſome imprudence; an accident which Mr. Baſſan informs me was very frequent in the beginning. And as none of the ſick, who have been brought to the hoſpital ſince my arrival, have died,

it

it would ſeem that the fumigation has not only leſſened the danger of infection, but alſo the malignity of the diſeaſe.

The proceſs of fumigating, as already deſcribed, with the *nitrous acid*, is ſimple and eaſy, and although the vapour is extremely powerful and penetrating, the ſick of every deſcription were obſerved to bear it, with little or no apparent inconvenience, and to a much higher degree than I could have expected; and as it is found to purify the air from the diſagreeable effluvia, produced by ſo many people crouded together in a confined ſituation, it will be peculiarly advantageous on board of ſickly ſhips, where the crew, their clothes, and the ſhip, may be fumigated at the ſame time without any riſk from fire.

December 16, 1795.

On the ſixteenth of December, I again viſited the Union hoſpital ſhip, and found that the fumigation had been hitherto car-

ried on regularly twice a day, and with the ſame evident advantages, in purifying the air of the hoſpital, and leſſening the malignity of the diſorder, ſo that every nurſe and attendant on the ſick, went now cheerfully and confidently about their duty; without the leaſt dread or apprehenſion of the contagion, by which means the ſick were better taken care of, and the general ſtate of the hoſpital was in a much more proſperous way. It was therefore, from this time, deemed ſufficient to fumigate only once a day.

December 23, 1795.

On viſiting the Union again on the twenty-third of December, I found the carpenters employed, from the dock yard, in making the alterations which I formerly propoſed in a letter to Dr. Carmichael Smyth, reſpecting the *neceſſaries*, and which I was happy to find, the Lords of the Admiralty had ordered to be done upon his application.

My

My propoſal was to remove all the *neceſſaries* from the inſide, and have them rebuilt on the outſide of the ſhip, and by cutting down the lower edge of the ſame number of port-holes, to form entrances into them from the hoſpital, by which they would be equally eaſy of acceſs to the ſick, and the nuiſance would be totally removed. This I was happy to find the carpenters were now executing, and I am confident it will be attended with beneficial effects, by rendering the hoſpital much ſweeter, and conſequently more agreeable and healthy, both to the ſick and attendants.

ARCHIBALD MENZIES.

Mr. Menzies, as is already mentioned in his Journal, having, on the 7th of December, reſigned to Mr. Baſſan, ſurgeon of the Union, the management of the experiment, I muſt refer your Lordſhip, for the further detail of this buſineſs, to extracts taken

from his letters, ſome of which you have already ſeen, and which are now arranged according to the order of time in which they were written.

Mr. Baſſan's conduct, my Lord, through the whole of this buſineſs, does him the higheſt honor, and cannot fail to recommend him to your Lordſhip's notice. When the contagion at firſt began to ſpread among the ſhip's company of the Union, he was importuned, by the warrant officers and others, to ſend them on ſhore to ſick quarters, which he peremptorily refuſed, ſaying, with the true ſpirit of a Britiſh ſailor: "It is better we ſhould all periſh, "than have ſuch a contagious fever as "this diſſeminated in our fleet." He accordingly made application to the Commander in Chief, and not a man was ſent out of the ſhip. His humanity and care of the ſick, Mr. Menzies mentions in the warmeſt terms of praiſe, and his ſucceſsful treatment of them, is the beſt teſtimony

of

of his profeſſional abilities. His zeal and attention, in conducting the experiment, I ſhall always recollect with gratitude. He and Mr. Menzies were both of them ſtrangers to me until this occaſion brought us acquainted; but I muſt ſay, that in the whole circle of my acquaintance, I could not have found two more liberal or candid men.

Extracts of Mr. Baſſan's Letters to Dr. Carmichael Smyth.

Sheerneſs, December 4.

I beg leave to inform you, that we have continued to fumigate, in the manner directed, daily; and as only one Ruſſian has died ſince we began, I conſider that circumſtance as an early proſpect of our future ſucceſs.

—— *December* 9.

We continue to fumigate the ſhip as formerly; your other inſtructions ſhall be punctually adhered to.

—— *December* 11.

I yeſterday ſent you two liſts or journals, one of the Ruſſian ſick, and the other of perſons belonging to the Union, who have been attacked with the fever; from the laſt you will perceive that very few days elapſed from the firſt importation of the diſeaſe, to the 26th ult. without ſome one or other of the attendants, or ſhip's company, being ſeized with it; but ſince that period not one has been taken ill. I intend, very ſhortly, to ſend you a brief account of the diſeaſe, the ſymptoms of which are at preſent much meliorated. I believe that the fumigation has been of great ſervice to the ſick. We have very few patients at preſent

ſent who are not in a convaleſcent ſtate, and there is every proſpect that, through your aſſiſtance, we ſhall ſoon become a wholeſome ſhip.

——— *December* 15.

Since my laſt of the 11th inſt. I have received eighteen patients with the fever, none of which have died, although ſome of them were brought to the hoſpital in a ſtate of the utmoſt danger. The utility of the fumigation appears now very evident, as, notwithſtanding the great number of fever patients brought into this hoſpital ſhip, not one of the attendants, or ſhip's company, have experienced the ſlighteſt indiſpoſition ſince we firſt began to employ it.—A very ſatisfactory demonſtration of its power in deſtroying contagion; indeed, Sir, I moſt ſincerely congratulate you on the ſucceſs of a diſcovery, which promiſes to be of ſuch eminent ſervice to ſociety. Believe me, every thing ſhall be done, on

my part, agreeably to your directions, to give it its full effect.

—— *December* 19.

The fumigation continues to demonſtrate its efficacy, as all the attendants, and ſhip's company, continue to enjoy perfect health, notwithſtanding I have lately received ſome patients with the contagious fever in as bad a ſtate as any I have ſeen; nor has a new nurſe, or any of the workmen, who are daily employed in the hoſpital making the propoſed alteration of the neceſſaries, ſuffered the ſlighteſt attack of the diſeaſe.—Mr. Menzies goes on with the Ruſſian ſhips, from which I hope ſoon to find the infection totally extinguiſhed.

—— *December* 21.

I am happy to inform you, that the contagion on board this ſhip appears to be nearly at an end, no one either of the attendants on the ſick, or of the ſhip's company,

pany, having been attacked with the fever ſince we began to fumigate, notwithſtanding we have received ſome patients in as bad a ſtate of fever, ſince that time, as any from the firſt importation of the diſeaſe. The people bear it exceedingly well, and I frequently ſtand in the midſt of a cloud, ariſing from the fumigation, as thick as a fog, without the ſmalleſt inconvenience, a circumſtance of great conſequence, as the ſick are all in the wards during the fumigation, and their clothes, &c. are conſequently impregnated with the acid vapour. In a few days we ſhall be able to aſcertain the ſucceſs on board the Pamet Euſtaphia, the only ſhip at this port in which the fever at preſent ſeems to prevail to any degree. I ſhall then conſider the experiment as compleat, and ſhall congratulate you on the ſucceſs of an invention, that, in all probability, will give you immortal honor, and which, from its public utility, you will ſo highly merit.

—— *December* 30.

Since my laſt, one nurſe and one marine have been taken ill of the fever, although the ſymptoms are evidently milder than heretofore. As it is impoſſible to ſay how long contagion may remain in an infected perſon before it is put into action, I am not at all diſcouraged by theſe two caſes; but ſhall continue every exertion in my power, in proſecuting the experiment, which has already been of ſuch eminent utility. I have received ſeveral patients from the St. Alexander Niewſki, and another Ruſſian ſhip, returned from ſea, five or ſix of them ill of the fever. I need hardly obſerve, that if you could by any means enforce the fumigating all the Ruſſian ſhips, as well as enjoin cleanlineſs, it would be of the utmoſt conſequence; and if you can ſend any perſon to aid me in the buſineſs, I ſhould be very glad; for though Mr. Menzies ſo ſtrongly recommended,

mended, to the Commanders, the neceſſity of continuing the fumigation, not one at Sheerneſs has made application to me for any materials for that purpoſe.

Extract of a Letter from Mr. Baſſan to Mr. Menzies.

Sheerneſs, December 30.

The Ruſſian ſhips which arrived this week from ſea, are ſickly. I received ſeveral with the petæchial fever, as bad as any I have ſeen; and am ſorry to ſay that nurſe Murray has had a ſlight attack, and one of the marines is at preſent ill of the ſame fever. He was taken ill on Tueſday morning, the ſymptoms are not ſo violent as formerly, and I ſhall double my attention in proſecuting the experiment which has already been of ſo much uſe.

To

To Dr. Carmichael Smyth.

Sheerneſs, January 4.

I cannot account for the contagion having produced the effects on the people mentioned in my laſt, otherwiſe than from the fumigation having been uſed the preceding week, only once a day, or from their having been infected prior to the commencement of it, which I think is not impoſſible. I am now determined to uſe it conſtantly twice a day, and have done ſo ſince Tueſday laſt, the day on which the marine was attacked; beſides, excluſive of the general fumigation, I place a fumigating pot or two in the wards near the worſt of the fever patients. The ſick not only bear the fumigation exceedingly well, but aid us voluntarily every day, the convaleſcents carrying the pipkins about, and expreſſing

preſſing their conviction of its keeping the wards ſweet, which certainly it does, and thoſe perſons who have hitherto eſcaped infection, are ſo much convinced of its efficacy, and have ſo much faith in its power, that I ſhould find it difficult to diſcontinue the uſe of it, whilſt there is a ſick man on board. As a week has now elapſed ſince any perſon has been attacked with the diſeaſe, notwithſtanding we daily receive patients in the ſame putrid petæchial fever, from the ſhip's lately arrived from ſea, I have every reaſon to expect our being once more a wholeſome ſhip. Be aſſured, Sir, that no pains ſhall be ſpared, on my part, to accompliſh ſo deſireable an object.

—— *January 7.*

I am happy to inform you that no perſon has been attacked with the putrid fever ſince my laſt, though we have received ſeveral ſick from the Ruſſian ſhips lately arrived from ſea.

January

—— *January* 13.

I am happy to acquaint you, that ſince we began again to fumigate the ſhip twice a day, no one has been attacked with the fever, although there are ſeveral carpenters at work in altering the neceſſaries, which are nearly compleated on the lower gun deck, and are to be altered immediately on the other deck.

I ſaw Captain Senevin, Commander of the Pamet Euſtaphia, the day before yeſterday, who informed me that he had continued the fumigation every day ſince Mr. Menzies's departure, and that he had now no ſick on board.

—— *February* 3.

I have the pleaſure to inform you, that the contagion ſeems now to be totally extinct, no one having been attacked with the fever ſince the 26th of December laſt, and

and only two ſince the 26th of November, the time when the fumigation was begun; one of theſe a marine, who, ten days previous to his being taken ill, had conſtantly drank very hard, and was often drunk; the other a nurſe, who was very ſlightly attacked, and both, in my opinion, might have received the infection long before it was put into action, as from their duty they were conſtantly expoſed to the contagion when it was firſt brought into the ſhip; and this is rendered ſtill more probable, as there have been ſeveral artificers at work, making the alteration in the privies, and of courſe amongſt the ſick, and likewiſe a freſh nurſe, a young woman immediately employed in the fever ward, none of whom have received the ſmalleſt injury. I therefore now conſider the experiment as compleat, and can bring ſufficient evidence to convince any one that the contagion in the hoſpital, on board the Union, has, through Divine providence, been deſtroyed

by the fumigation you recommended: beſides, as the acid vapour keeps the ſhip ſweet, it is my intention to continue it for that purpoſe conſtantly, if I am permitted ſo to do. The ſick bear it perfectly well, and, from its power in deſtroying alkaline vapour, it renders the air pure, and conſequently grateful both to the ſick and convaleſcents, as well as to thoſe whoſe duty it is to attend them. I moſt ſincerely congratulate you on the ſucceſs of this buſineſs,

And am,

Sir, &c.

A. BASSAN.

To

To the preceding account of the experiment on board the Union, I ſhall take the liberty, my Lord, to ſubjoin a brief deſcription of the trials made, at the requeſt of the Ruſſian admiral, and with the approbation of your Lordſhip, on board ſome ſhips of that ſquadron: and here I muſt again refer you to Mr. Menzies's journal.

REPORT

OF THE

EXPERIMENT

FOR

Stopping the Progreſs of Contagion, *as executed on board ſome of the Ruſſian Men of War, by Mr. Arch. Menzies.*

SOON after my arrival at Sheerneſs, I had the honor of being introduced to his Excellency Admiral Hannikow, Commander of the Ruſſian ſquadron at that port, on which occaſion he was pleaſed to expreſs a particular deſire of having the moſt ſickly ſhips

ſhips of his ſquadron purified, by the ſame proceſs of fumigation, as I was then carrying on, on board the Union hoſpital ſhip. This being made known to the Lords Commiſſioners of the Admiralty, they were pleaſed to declare their approbation, by requeſting Admiral Buckner to confer with his Excellency on this ſubject: and on the twenty-eighth of November, it was agreed between theſe Commanders, that the fumigation ſhould be tried, under my directions, on board ſuch of the Ruſſian veſſels as were then moſt infected with the contagious fever, which had already proved ſo fatal to many of their crews; and it is but juſtice to ſay, that his Excellency, on this occaſion, ſhewed a particular zeal for its ſucceſs, by offering me every aid and aſſiſtance, and by aſſuring me of a ready compliance, with every means that might be ſuggeſted to accompliſh ſo deſireable an object, as the health and preſervation of thoſe under his command. But it

ſo happened, that, on the day following, he was ordered, with part of his ſquadron, to the North Seas, and in this ſtate of hurry, not having time to conſider which was the moſt ſickly veſſel, he left orders for the trial to be made on board the Revel frigate; but on examining the hoſpital books on board the Union, the Pamet Euſtaphia, of 74 guns, appeared to claim our firſt attention, from her ſickly ſtate: I therefore waited on Admiral Buckner, to acquaint him with this circumſtance, and he very readily applied to Capt. Chechagoff, on whom the command of the remaining part of the Ruſſian ſquadron had devolved, and obtained his leave for the trial to be made on board of her, in preference to the other. After this, ſome unavoidable delay was occaſioned, in waiting for the materials, and collecting together the utenſils neceſſary for the operation.

In the forenoon of the ſeventh of December, 1795, I went on board the Pamet Euſtaphia,

Euſtaphia, and having ordered the ports, ſcuttles, and hatchways to be cloſe ſhut up, with the ſhip's company between decks, we fumigated her for the firſt time, and continued it morning and evening on the following day, in the ſame manner that we had done the Union hoſpital ſhip.

This ſhip has of late ſent more ſick with the malignant fever to the hoſpital, than all the reſt taken together, of the Ruſſian ſquadron laying at this port, which her Commander, Capt. Sinavin, attributes in a great meaſure to her ſhingle ballaſt being chiefly compoſed of ſand, intermixed with a large portion of wet earth, that keeps up a conſtant moiſture and dampneſs below, in ſpite of every means of ventilation: add to this the putrid ſtench, ariſing in ſo cloſe and crouded a ſituation from the *ſhubs* or ſheep-ſkin great-coats, which are generally wore by the Ruſſian ſeamen, with the woolly ſide next their body, and which undoubtedly muſt aid to nouriſh

the ſeeds of contagion, and increaſe its virulence.

I repreſented to ſeveral of the Commanders of the Ruſſian men of war, the neceſſity there was of deſtroying, or at leaſt of ſuppreſſing theſe *ſhubs* in this country, for though they might be very comfortable, and anſwer pretty well in dry, cold, froſty weather, ſuch as is generally the caſe in the long winters in Ruſſia, yet they were by no means calculated for the chilly wet weather which generally prevailed in this country; as in a damp ſtate they never fail to impregnate the air with offenſive putrid effluvia, that muſt be extremely hurtful to peoples conſtitution where it is conſtantly breathed by ſo many crowded together in ſuch a confined ſituation.

Early on the morning of the ninth, the Pamet Euſtaphia, with the Ratvezan of 66 guns, were removed up to Chatham, in conſequence of which it was not in my power to continue the fumigation, though I went

I went there on purpoſe. And on the following day, the crew was ſo buſily occupied, in unrigging the ſhip, and clearing her of ſtores and proviſion, to prepare her for going into dock, that no time could be ſpared to attend to the fumigation, until that duty was accompliſhed; which as it would take up ſome days, and as her people were then to be put on board a receiving ſhip, while ſhe was in dock, (a circumſtance I conſidered as very unfavourable to the experiment) I therefore came to London on the eleventh, to conſult with Doctor Carmichael Smyth, what plan was beſt to purſue; for as this was the only Ruſſian veſſel from which a fair eſtimate could be drawn of the utility and efficacy of the fumigation, I was anxious to continue it, in whatever manner might be thought moſt likely to ſecure ſucceſs in deſtroying the contagion, or leſſening its malignity.

I re-

I returned to Chatham again on the fourteenth, with orders to fumigate as many of the Ruſſian veſſels, eſpecially ſuch as were moſt ſickly, as I poſſibly could; for though the experiment could not be regularly carried on, yet in this manner it might leſſen the virulence of the diſorder, and diminiſh the number of ſick ſent to the hoſpital.

Next day I waited on Capt. Chechagoff and Capt. Sinavin, and found that their veſſels were not yet cleared of their ſtores, &c. ſo that I could not go on with either. Indeed, the Ratvezan was pretty healthy, her Commander, Capt. Chechagoff, being very attentive to every means of purifying his veſſel by ventilation and cleanlineſs, and by deſtroying and ſuppreſſing the *ſhubs*, as far as he poſſibly could; for he told me, he could not do them away altogether, without giving the men other cloathing *in lieu*, which muſt be done by an order from the Commander in Chief.

Captain

Captain Chechagoff alſo informed me, that the Pimen, of 66 guns, was arrived at Sheerneſs, which had, ſome time ago, been ſo very ſickly, that boats from other veſſels were forbid coming along-ſide of her, from a dread of the infection; he therefore expreſſed his deſire of having her well fumigated; and I immediately ſet out to execute his requeſt.

On the ſixteenth of December, I fumigated the Pimen, for the firſt time. Her crew, however, was nowiſe ſickly now, although on viſiting her between deck, before the fumigation, the ſtench produced by the *ſhubs* was very perceptible, and extremely offenſive; and it was pleaſing to obſerve the ſudden change produced by the powers of the nitrous vapour in deſtroying it.

When I went on board, on the following day, to continue the fumigation, I found the officers and crew attending Divine Service, and the Prieſts ſprinkling the decks with Holy-water, ſo I did not intrude; but

but left orders, with their own Surgeon, to fumigate the ſhip in the evening, if he could conveniently, which he did. As this was a holiday amongſt them, I alſo declined calling on board the Revel frigate till the next day, when, after fumigating the Pimen, I went on board the Revel, to requeſt them to prepare for fumigating her. On viſiting this veſſel between decks, I found the putrid ſtench from the *ſhubs* extremely offenſive and diſagreeable from the confined air, and want of ventilation; and I had great difficulty to make myſelf underſtood, or give any particular directions for want of an interpreter.

The nineteenth was ſo boiſterous that I could not get on board either veſſel, but the Surgeon of the Pimen was ſo good as to continue the fumigation as uſual. Captain Colokolſoff, the Commander of this veſſel, was extremely civil, and well diſpoſed to promote my endeavours; and the principal officers were equally polite and

ready

ready to ſee my directions executed on all occaſions.

Next day I viſited the Pimen, which was now quite free from ſtench or any offenſive ſmell, in conſequence of the fumigation having been regularly continued. I alſo began to fumigate the Revel frigate, and regularly attended both veſſels, for the three following days; after which I left the materials and utenſils on board them, with directions to their own Surgeons, to continue it in the ſame way daily.

From what information I could collect, the Revel had not been very ſickly, yet the few ſhe had lately ſent to the hoſpital, were malignant fevers, which clearly ſhewed that the contagion was lurking on board her, though it did not ſpread with much violence.

Being particularly anxious to reſume the experiment on board the Pamet Euſtaphia, ſhe being the moſt ſickly, and on that account claiming more particular attention, I came

up

up to Chatham on the twenty-fourth, and found ſhe had been juſt hauled into dock, and her crew put on board the Prince Edward receiving ſhip, where they were very much crouded. On the following day I began the fumigation, but as many of the ports and hatchways of the ſhip could not be ſhut cloſe enough to retain the vapour for a ſufficient length of time, a quick and ſtrong fumigation became more eſſentially neceſſary; which however I could not get them to execute, not being able to make them underſtand my meaning, for want of a ſufficient knowledge of their language.

The fumigation was, notwithſtanding, continued regularly on board this ſhip for the four following days, although it was not in my power to prevail on them to do it ſufficiently ſtrong, to do juſtice to the trial,—and to inſure that ſucceſs we had already experienced on board the Union; their excuſe generally was, that

that the fire was too much occupied to get a ſufficient quantity of ſand heated.

But, as it was poſſible, that even this ſlight fumigation might ſucceed by long continuance, and as their own Surgeon was now acquainted with the proceſs, and well diſpoſed to carry it on, I left the materials and utenſils on board; and, before my departure, waited on Captain Sinavin, who, at this time, lived on ſhore, and who (after being acquainted with the foregoing circumſtances) ſaid that he ſhould order it to be continued while his ſhips company were anywiſe ſickly.

The Ratvezan having likewiſe gone into dock; to prevent her crew becoming ſickly on board the receiving ſhip, I, at Captain Chechagoff's particular requeſt, ſent utenſils and materials on board to fumigate daily.

Having now put theſe Ruſſian veſſels in a fair train for continuing the fumigation; and finding that my preſence, on account of my ignorance of their language,

could not be of any further ſervice; at the ſame time, ſome urgent buſineſs, of our late voyage, preſſing hard upon me, I returned to town on the thirtieth of December, leaving the further proſecution of the experiment, as above related, to be conducted by their own Surgeons; and I have the moſt pleaſing hopes that it will be attended with beneficial effects to her Imperial Majeſty's ſubjects, not only in the preſent inſtance, but in every ſimilar ſituation hereafter.

ARCHIBALD MENZIES.

Having

Having now, my Lord, finiſhed with the account of the experiment given by the two gentlemen who have been employed in conducting it, permit me, before concluding the ſubject, to call for a moment your Lordſhips attention to ſome of the principal circumſtances, and to the concluſions which they afford.

In the firſt place, my Lord, it muſt be allowed that the preſent experiment fully juſtifies all I have ſaid reſpecting the ſafety with which the nitrous acid (procured in the manner deſcribed) may be employed as a fumigation. No one ſurely can ſay that I aſſume too much, when I conſider the ſafety of the fumigation as eſtabliſhed, after a trial of nearly three months, for an hour and a half or two hours, morning and evening, each day, on board an hoſpital ſhip, containing from two to three hundred perſons of different ſexes, and ages, and labouring under different diſeaſes; without a ſingle inſtance of perma-

nent inconvenience or bad conſequence ariſing from it: for the ſlight cough, which it at firſt excited and which was evidently owing to the aukwardneſs and ignorance of thoſe who carried the fumigating pipkins, cannot be looked upon as ſuch, and no farther inconvenience has ever been felt by any one on board.

Having eſtabliſhed then this important fact, that the nitrous acid is attended with no riſk to the health or ſafety of the people expoſed to it, let me next claim your Lordſhips attention to the ſenſible and immediate effects of it.

We are told by Mr. Menzies, that after the firſt fumigation, and ſtill more remarkably after the ſecond, the air of the hoſpital was perceived to be purer, and free from any putrid or offenſive ſmell: theſe immediate effects of the fumigation, are likewiſe repeatedly mentioned by Mr. Baſſan, the laſt of them indeed was too ſtriking not to be taken notice of by every perſon on board. That the

vapour of the nitrous acid ſhould be found to deſtroy an offenſive ſmell, the effect of animal exhalations, I was not ſurpriſed at, having myſelf had repeated experience of the fact; but that it would alſo render the air purer and more proper for reſpiration, I was by no means certain, until I found the repeated obſervations of thoſe Gentlemen, confirmed by the evidence of Mr. Keir, of Birmingham, one of the firſt chemiſts in this country, or perhaps in Europe; an extract of a letter from this gentleman, whom I have not the honor to know perſonally, to a friend of his in town, I have ſubjoined for your Lordſhip's ſatisfaction, as it affords a convincing proof, from chemiſtry, of the truth of what Mr. Menzies and Mr. Baſſan obſerved in practice. Theſe two qualities, my Lord, viz. the rendering the atmoſpheric air purer, and conſequently fitter for the purpoſes of animal life, and the compleatly deſtroying the offenſive ſmell reſulting from animal

effluvia or putrid matter, are, of themſelves, conſiderable advantages, if no others were to be expected or derived from the fumigation; but they are of ſtill higher importance, when conſidered as preſumptive evidence of the power of the nitrous vapour to deſtroy contagion; for whatever is found to deſtroy the ſmell of putridity, and at the ſame time to render the air purer, we muſt ſuppoſe more or leſs conducive to this grand object. But preſumptive evidence, on a ſubject of this importance, in which the lives of thouſands are involved, is not ſufficient to ſatisfy the mind; and, happily for mankind, the preſent experiment, inſtituted under your Lordſhip's auſpices, affords compleat and direct evidence of the fact.

But to bring this home to the underſtanding and conviction of all mankind, it is only neceſſary to look with attention, at the annexed Hoſpital Return; for by comparing the ſtate of health of the ſhip's com-

company, with the progreſs and effects of the contagion, before and after the experiment was begun, a clear and decided judgment may be formed of its effects, even by the moſt ignorant. They will in the firſt place obſerve, that from the 3d of September (the day the Ruſſians, ill of the fever, were firſt brought on board) to the firſt of October, there were nine perſons ſeized with the diſtemper, one of whom only belonged to the ſhip's company; the others were attendants on the ſick. That in the month of October, eight perſons more were attacked with the diſeaſe, and of thoſe three belonged to the ſhip's company. But, that from the firſt of November, to the 26th of that month, twelve perſons were attacked with the diſeaſe, among whom we find eight belonging to the ſhip's company. From this ſhort ſtatement it is evident, that the contagion which was at firſt chiefly confined to the hoſpital, affecting thoſe only who were immediately employed about the

ſick, had gradually ſpread over the ſhip, and been communicated to the ſhip's company; by which means the ſickneſs and mortality had encreaſed: and the probability is, that had not a ſtop been put to it, it would have gone on encreaſing in proportion to the diffuſion of the contagion, and to the encreaſing deſpondency of the people, who conſidered themſelves as ſo many devoted victims. The whole number of perſons ſeized with the diſtemper, during the firſt three months that it prevailed on board the ſhip, was 30 (beſides ſix children) which was more than one-third of all the people in the ſhip, who were only 85, officers included. Of the 30 ſeized with the fever, eight died of the immediate effects of it, a large proportion ſurely, being not much leſs than one in three, and which ſufficiently marks the malignity of the diſtemper.

Having taken a view of the ſtate of the ſhip's company, and of the progreſs of the con-

contagion before the experiment, let us now, my Lord, turn to the other ſide of the picture, and ſee what was the ſituation of things after the fumigation was begun.

On the 26th of November, the ſhip was fumigated for the firſt time, and from that day to the 25th of December, not a perſon on board was attacked with the fever, their deſpondency was now changed into joy, and their fear into confidence; but as very great confidence is always dangerous, it proved ſo in the preſent inſtance. On the 17th of December, they imagined themſelves ſo ſecure, that they diſcontinued the cuſtom of fumigating the ſhip morning and evening, thinking that once a day was ſufficient; the trial, perhaps, was worth hazarding, but on the 25th of December, one of the nurſes ſuffered a ſlight attack, and on the 26th, a marine, who for a week preceding had been in a ſtate of intoxication, was ſeized with the fever, of which he died. Theſe two accidents gave imme-

diate alarm; they returned again to the practice of fumigating twice a day, and from that time to the end of the diſorder, there has not been an inſtance of a perſon ſuffering from contagion on board the ſhip. But the advantage of the fumigation was not felt by the ſhip's company and attendants alone, whom it preſerved from the baneful effects of the fever, the ſick and convaleſcents derived almoſt an equal benefit from it. The ſymptoms of the diſeaſe (as Mr. Baſſan expreſſes it) were meliorated, and loſt much of their malignant appearance, and the advantage of a pure air, and free from ſtench, to convaleſcents, may readily be conceived.

From the above relation, my Lord, it plainly appears, that whilſt the practice of fumigating the ſhip twice in the 24 hours was continued, there was no ſymptom of contagion or of diſeaſe, and that the only two accidents which happened from the commencement of the experiment, to the

preſent

preſent hour, occurred on the 25th and 26th of December, nine or ten days after they had ceaſed to fumigate the ſhip, in the manner I had directed. The attack of the nurſe, indeed, was but trifling, and I think it not improbable that the fever, as well as the death of the marine, were the conſequence of his own intemperance; at any rate, ſuppoſing both the one and the other to have ſuffered from contagion, theſe caſes do not in the leaſt invalidate the general ſucceſs of the experiment, and only prove, that in a ſituation where contagion is conſtantly generated, it requires to be as conſtanly deſtroyed; otherwiſe it is ready at every inſtant, like the hydra, to rear again its peſtilential head.

But, my Lord, the ſucceſs of the experiment has not been confined to the Union, the power of the nitrous vapour to deſtroy contagion, has been equally diſplayed on board thoſe Ruſſian veſſels where it has been employed.

Your

Your Lordſhip muſt have obſerved, in Mr. Menzies's journal, the many unexpected delays he met with in the execution of this buſineſs. The ſudden departure of the Ruſſian Admiral, with a conſiderable part of the fleet, before the ſhips, the moſt proper for the experiment, were fixed upon; Mr. Menzies beginning, in conſequence of not being properly informed, with ſhips where the fumigation was not ſo immediately neceſſary; afterwards, when he began to fumigate the Pamet Euſtaphia, which had ſent more ſick to the hoſpital than any ſhip of the fleet, ſhe was immediately ordered into dock, and the crew turned over into a receiving ſhip, a ſituation extremely diſadvantageous for ſuch an experiment: not to mention the various difficulties and obſtacles ariſing from the difference of language, uſages, religious ceremonies, &c. ſufficient to have diſcouraged a man of a leſs firm mind, or who was leſs zealous, than Mr. Menzies in purſuing his object. He

per-

perſevered, however, for ſome time, but at laſt was under the neceſſity of returning to town, and of leaving the farther proſecution of this buſineſs to the Ruſſians themſelves; and yet, my Lord, owing to the good ſenſe and proper conduct of their officers, who, convinced of the advantage of the fumigation, continued the daily practice of it; thoſe ſhips that have been fumigated, are free from contagion, and particularly the Pamet Euſtaphia which was the moſt ſickly, is now one of the healthieſt of the fleet, and has no appearance of contagion on board, nor a man ill of the fever; and ſo great is the opinion entertained by Admiral Hannicoff, of the efficacy of the fumigation, that he lately ſent to town for materials for fumigating ſome more ſhips.

Such, my Lord, has been the reſult of an experiment, by which ſome lives have been already ſaved, and from which two important facts are clearly eſtabliſhed, viz. the

the power of the nitrous acid to deſtroy contagion; and the ſafety with which it may be employed in any ſituation, without inconvenience or riſk of fire.

It would be, perhaps, improper in me to detain your Lordſhip any longer on this ſubject, by endeavouring to point out the importance and extenſive application of the preſent diſcovery; a diſcovery equally applicable to every ſpecies of putrid contagion, even to the plague itſelf; a diſcovery, therefore, in which all nations are more or leſs intereſted, but whoſe utility muſt be moſt ſenſibly felt by our own; where a commerce, extended to every quarter of the globe, covers the ſea with our ſhips, whilſt our gallant navy ſtill maintains the decided empire of it.

Oh fortunatos nimium, ſua ſi bona norint,
Britannos!

A RE-

A RETURN of thoſe perſons, amongſt the attendants on the Hoſpital, or belonging to the Ship's Company of the Union, who were attacked with the Contagious Fever, from the 3d of September, 1795, when the Ruſſian ſick were firſt brought on board, to the 10th of February, 1796; the date of the laſt report.

(Signed) A. BASSAN, Surgeon of the Ship.

Names	Quality	When ſeized	Recovered	Dead
S. Brown	Nurſe	Sept. 6	———	
H. Warren	———	—— 7	———	
M. Mitchel	———	—— 9	———	
M. Reed	———	—— 11	———	
Mr J. Gardner*	S[t] 1ſt Mate	—— 15		Sep. 24
M. Rawlins	Nurſe	—— 18	———	
S. Hayes	———	—— 20	———	
Tho. Mitchel	Helper	—— 22	———	

* He was diſcharged from the Union, and entered on board the Sandwich, the 12th of September; was taken ill a few days after, and died in about a week.

Names	Quality	When seized	Recovered	Dead
A. Clavering	Nurſe	Sept. 24		Sep. 28
Tho. Lee	Marine	—— 29		Oct. 1
M. Sawer	Waſher-wo.	Oct. 6		—— 15
Mr Meſſerſmide	S[d] 1ſt Mate	—— 6	——	
A. Bright	Nurſe	—— 8		—— 11
D. Sawer	Ab.	—— 8	——	
H. Tuberville	Nurſe	—— 14	——	
Mr. Bodker	2d S[d] Mate	—— 22	——	
Cha. Walton	Ab.	—— 22	——	
James Potter	Marine	—— 22	——	
C. Taylor	Nurſe	Nov. 2	——	
S. Parker	Waſher-wo.	—— 4	——	
Wm. Craſby	Marine	—— 4	——	
Wm. Welch	——	—— 10	——	
Rd. Welch	Ab.	—— 10	——	
Henry Kelly	—	—— 17	——	
Peter Parker	—	—— 17	——	
Geo. Maatle	Marine	—— 18	——	
Tho. Reed	S[t] Marines	—— 18	——	
Joſ. Copeland	Ab.	—— 20		Dec. 4
Ja. Tuberville	Marine	—— 20		Nov. 24
M. Clay	Waſher-wo.	—— 24		T. uncertain
Before the Experiment.——		Total 30	20	8

The

Names	Quality	When ſeized	Recovered	Dead
Marg. Murray	Nurſe	Dec. 25	{ Recov. in a few days	
James Farmer	Marine	—— 26		Jan. 6
Since the Experiment.——Total		2	1	1

N. B. On the 26th of November, the ſhip was fumigated for the firſt time, and the fumigation repeated twice a day till the 17th of December; from that time to the 26th of December, only once; but from the 26th of December to the 10th of February, twice a day, as at firſt.

A Weekly

A Weekly Return of the Ruſſians received on Board his Majeſty's Hoſpital Ship Union, in the Malignant Fever from the 3d of September, 1795, to the 28th of January, 1796, excluſive of thoſe received in a ſtate of debility after the ſaid Fever, and with other diſeaſes. By A. BASSAN, Surgéon of his Majeſty Ship Union.

Sept. 1795.	Received.	Diſcharged.	Dead.
Sept. 3	37		
—— 10	37	1	
—— 17	4	7	
—— 24	34	7	1
Oct. 1	17	17	5
—— 8	29	15	
—— 15	20	5	2
—— 22	15	14	1
—— 29	18	11	1
Nov. 5	31	9	1
—— 12	21	13	
—— 19	20	44	5
—— 26	29	39	1
Dec. 3	12	5	1
—— 10	12	16	1
—— 17	35	48	
—— 24	8	25	1
—— 31	40	1	
1796.			
Jan. 7	32	25	3
—— 14	13	7	2
—— 21	20	24	3
—— 28	22	23	6
Total	479	356	34

N. B.

N. B. The greater part of the Ruſſian ſquadron ſailed on a cruize November 29, and returned into port December 27, two or three ſhips at a time.

From the above return it appears, that the number of perſons ill of the contagious fever, brought on board the Union, the two laſt months, December 1795 and January 1796, were nearly equal to the number received the two preceding months, October and November. It alſo appears that for the firſt month, after the ſhip was fumigated, there were few fever patients who died. The encreaſe in the number of deaths in the following month, may fairly be aſcribed to the return of the fleet.

APPENDIX.

Extract of a Letter from Mr. Kier, of Birmingham, to a Friend in Town.

January 25, 1796.

I conſider Dr. Carmichael Smyth's diſcovery to be very valuable. The fumes in his proceſs are quite different from the ordinary nitrous vapour in the diſtillation of aqua fortis, or from that which exhales in the ſolution of metals, by nitrous acid; the latter is highly ſuffocating and noxious, and may be called the phlogiſticated nitrous acid vapour. The fumes made in Dr.

Smyth's manner (if there is no metal employed in the veſſel, &c.) is highly dephlogiſticated or oxygenated nitrous vapour, and is alſo mixed with a large quantity of pure dephlogiſticated air, which is extricated from the materials, and theſe fumes are not only not ſuffocating, but have a very pleaſant ſmell. If the diſtinction is not made between theſe two kinds of vapour, it is to be feared that ſome perſon, by accident, or in expectation of getting the nitrous vapour more expeditiouſly, may uſe metal veſſels, or diſſolve metals in nitrous acid.

Extract of another Letter from Mr. Keir, dated near Birmingham, March 3, 1796.

The difference between the white nitrous acid, (called, by Dr. Prieſtley, dephlogiſticated acid, and by the French chemiſts, acide nitrique;) and the red acid, called phlo-

phlogiſticated, or acide nitreux, is well known, and was firſt particularly noticed by Scheele, who ſhews how the one may be ſeparated from the other by diſtillation. There is the ſame difference in the colour of the vapours from theſe two acids; and Dr. C. Smyth has himſelf obſerved, that the vapours, in the diſtillation of nitrous acid, were not noxious; which obſervation he has very happily and uſefully applied. In diſtilling the nitrous acid from very ſmall quantities of nitre, and oil of vitriol, in glaſs veſſels, and when the materials are very pure, I have ſeen nothing but the white vapours, ſuch as ariſe in Dr. C. Smyth's proceſs, but Scheele ſays, that at the end of the operation, ſome red vapours riſe, and it may be the caſe when a very ſtrong heat is applied. But the very noxious red fumes which appear in the uſual proceſs of diſtilling aqua fortis, are occaſioned, as you mention, by the iron veſſels; and the manufacterers even put in old nails

and ſmall pieces of iron into their pots, in order to give a high degree of red ſmoking quality to the acid. When you acquainted me of Dr. C. Smyth's diſcovery, it occurred to me, that as the common notion of nitrous acid vapours, is confined to thoſe that are red, ſome people might, in the firſt place, be prejudiced againſt it, from the idea of the vapours being noxious; as the red vapours are undoubtedly, and others might think that they made the proceſs more effectual, by adding to Dr. C. Smyth's mixture, metals, or inflammable ſubſtances, in order to produce thoſe red vapours. I therefore thought it would be proper for Dr. C. Smyth, to point out the difference between the vapours produced in his method, and the red nitrous fumes which are ſo well known; and alſo to caution the operators to avoid metal veſſels, or the addition of metals or inflammable ſubſtances.

There

There is a good deal of vital air extricated from the mixture, but I cannot agree with thoſe who attribute the medicinal effect to it, we know little of this ſubject; but the analogy of the deſtruction of all animal and vegetable fermentation by mineral acids, which is well aſcertained, inclines me to believe the agency of the acid, in the deſtruction of the contagion. The matter of which is, I preſume, animal, in ſome vitious kind of fermentation.

A Letter from Mr. Baſſan, Surgeon of his Majeſty's Ship Union, to Dr. Carmichael Smyth, under date, the 16th of February, 1796.

DEAR SIR,

We had an encreaſed mortality amongſt the Ruſſians laſt month, but, thank God, not

not from the contagious fever, that being now totally extinct; but from ſome being brought in a dying ſtate, others in the ſcurvy, the moſt deplorable caſes I ever ſaw, added to which, ſeveral hectic patients, who had been declining ſome time, happened to die at that particular period. I hope we ſhall have no return of ſo dreadful a calamity.

I remain,

Sir,

Your moſt obedient Servant, &c.

(Signed) A. BASSAN.

Extract

Extract of a Letter to Mr. Menzies, from Captain Chechagoff, Commanding Officer of the Ruſſian Fleet, in the abſence of his Excellency Admiral Hannicoff. Dated Chatham, March 9, 1796.

Agreeably to your wiſh, it is with the utmoſt pleaſure that I expoſe the proofs of a truth ſo uſeful for the human kind, and ſo much to the honor of thoſe that are the primitive cauſe of it, and thoſe that put them in execution, with an efficacy, as is acknowledged in the certificate here joined. I beg to preſent my compliments to Dr. Smyth, for whom I have the reſpect that is owing to all thoſe who have aſſured their renommée *, by the good they have done to the public, and to get its ſuffrage. I am, with much eſteem, &c.

(Signed) P. CHECHAGOFF.

* The public will recollect that Captain Chechagoff is a foreign officer, writing Engliſh, and therefore will not be ſurpriſed at his making uſe of one French expreſſion.

CERTIFICATE.

" It has been obſerved that the fumi-
" gation, with the nitrous acid, introduced
" by Mr. Menzies on board the ſhip
" Pamet Euſtaphia, has produced, in a
" ſhort time, the beſt effect in ſtopping
" the progreſs of the fever and other evils,
" which were then evidently increaſing,
" for which reaſon it was not only regu-
" larly continued on board of that ſhip,
" even after Mr. Menzies's departure, but
" adopted on board of others, and always
" found uſeful. It is therefore my duty
" to certify by this not only the good con-
" ſequences that have been obſerved from
" that uſeful contrivance, but even the
" advantage that ariſes from its eaſy and
" ſure execution, in compariſon with other
" means of fumigating the ſhips which

" requires greater attention from the fire " that muſt be made uſe of, and therefore " cannot be effectuated in all the parts of " of the ſhip."

(Signed) CHECHAGOFF,

Captain and ſenior Officer of the Ruſſian Fleet.

March 10, 1796.

FINIS.

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